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PROGRESS REPORT  
of the  
CONSUMER AND FOOD ECONOMICS RESEARCH DIVISION  
AGRICULTURAL RESEARCH SERVICE

APR 1 1969  
CURRENT SERIAL REVIEW

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This progress report includes a summary of the current research of the Division and a preliminary report of progress made during the period July 1, 1968-March 31, 1969. It is primarily a tool for use of scientists and administrators in program coordination, development and evaluation; and for use of advisory committees in program review and development of recommendations for future research programs.

The summaries of progress on USDA and cooperative research include some tentative results that have not been tested sufficiently to justify general release. Such findings, when adequately confirmed, will be released promptly through established channels. Because of this, the report is not intended for publication and should not be referred to in literature citations. Copies are distributed only to members of Department staff, advisory committee members and others having a special interest in the development of public agricultural research programs.

This report also includes a list of publications reporting results of USDA and cooperative research issued between July 1, 1968, and March 31, 1969. Current agricultural research findings are also published in the monthly USDA publication, Agricultural Research. This progress report was compiled in the Consumer and Food Economics Research Division, Agricultural Research Service, U. S. Department of Agriculture, Hyattsville, Maryland 20782.

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UNITED STATES DEPARTMENT OF AGRICULTURE

Washington, D. C.

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1/ Research Problem Area

## INTRODUCTION

The goals of research in this Division are to improve the dietary situation, and levels of living and home management practices of families in the U.S. The research involves studies of the kinds, amounts, and costs of food consumed by different population groups, the food habits of individuals and the practices of families in the purchase and household use of various foods; the development of tables of the nutritive values of foods; nutritional appraisal of diets and food supplies; development and improvement of procedures for use and care of food in homes and institutions; and studies of the kinds, amounts, and costs of goods and services used for family living by rural households; studies of family practices in their management of financial and other resources; and special economic studies of clothing and household textile use by families. On the basis of this and other research, guidance materials such as food budgets, dietary guides, and other aids are developed to help families obtain better diets and make the most advantageous use of their money and time resources. Research studies are also carried out to improve and backstop the food assistance programs of the Department.

Research results are interpreted for use in rural development and other Federal antipoverty programs by a senior staff member who is an active member of a wide variety of interagency, interdepartmental and professional groups which are concerned with problems of low-income families and their solution.

Research findings are disseminated to the scientific public through technical publications; to teachers and other leaders concerned with helping families and consumers, through semitechnical reports; and to consumers themselves, through popular-type publications. Two periodicals issued regularly by the Division help to disseminate research findings or current information of concern to the groups reached - Nutrition Program News prepared for members of State nutrition committees and other workers in nutrition programs; and Family Economics Review, servicing extension agents, teachers, and other professional workers interested in family and food economics and home management.

The program of the Consumer and Food Economics Research Division is carried out at Hyattsville, Maryland, and under contracts and cooperative agreements and grants with State Experiment Stations, universities and private research organizations. The scientific effort devoted to this research during the reporting period July 1, 1968-March 31, 1969 totaled 22.1 scientific man-years at Hyattsville 1/. During this period, funds equivalent to 0.6 scientific man-years were obligated for research to be carried out under cooperative agreement. Work continued under several previously funded contracts, cooperative agreements and grants. The present report summarizes the

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1/ This is 75 percent of the scientific man-years devoted to this research during FY 1969.



current program of the Division, and presents briefly the Division's progress toward the objectives of the Federal program during the period July 1, 1968-March 31, 1969

Four examples of recent progress in the Division's research program follow:

New Data on Diets of Family Members. An ARS study of the food intake of a representative sample of 14,500 men, women and children in the U. S. during one day (midnight to midnight) in spring 1965 showed that average diets for most sex-age groups approached (90-100 percent) or were above the Recommended Dietary Allowances set by the Food and Nutrition Board of the National Academy of Sciences-National Research Council for calories and five of the seven nutrients studied--protein, vitamin A value, thiamin, riboflavin and ascorbic acid. Calcium and iron were the nutrients most often below recommended amounts, especially in diets of girls and women. In general, the diets of males met allowances for more nutrients than the diets of females. Except for iron, the average diets of children under nine years of age were above recommendations. The diets of adolescent girls and women contained less than recommended amounts of calcium, iron and thiamin, and for some age groups, vitamin A value and riboflavin. Older men also had diets low in calcium, vitamin A, riboflavin and ascorbic acid. From this first nationwide survey of the food intake of individuals, information has also been summarized on the amounts of foods used during a day by the 22 sex-age groups into which individuals were classified and on the use of vitamins or mineral supplements.

Data on Diets of "Hard-core Poor" Families Summarized. A review of ten studies of the food consumption of families eligible for U. S. Department of Agriculture food assistance programs made at six locations by ARS scientists between 1961-1967 has provided information needed in developing programs to improve the dietary situation of "hard-core poor" families. Although some families eligible for food assistance programs had good diets, the average diet of such families was of lower nutritional quality than that of those families in the 1965 nationwide survey with incomes less than \$3,000. Families eligible for food assistance had diets in need of improvement in the same nutrients as families in the nationwide survey--calcium, ascorbic acid and vitamin A. They used about the same amounts of foods in the bread-cereal group but in most cases less of foods in the milk, meat and vegetable-fruit groups. Families eligible for assistance spent on the average about half of their incomes for food. They spent little on meals and snacks purchased and eaten away from home. Results of this review have been used in nutrition education programs and in evaluations of the effectiveness of consumer food programs.

Diet Quality of Preschool Children Analyzed. A survey to evaluate diets and nutritional status of 2 to 3 year-old children in low- and middle income families in Hawaii is providing new guidelines for child feeding and family assistance programs. Approximately 75 percent of the children in both income groups consumed food that provided less than two-thirds of the NAS-NRC Recommended Dietary Allowance for iron. Eleven to 46 percent of the children's diets did not provide two-thirds of the allowances for one or more

of the other nutrients studied. More children of the low-income than middle-income families had low intakes for all nutrients except iron. Clinical examinations gave no evidence of specific nutritional deficiency. However, some conditions related to nutritional deficiency (poor muscle tone, tooth decay, pallor, and apathy) were more prevalent among children in low-income families. The study of 281 children was carried out by the University of Hawaii under cooperative agreement with the Agricultural Research Service.

Sources of Calcium in Diets Change. Sources as well as levels of calcium in diets have changed significantly during the past 60 years according to ARS nutritionists who have calculated the amount of calcium in the national food supply. Both calcium and dairy products, the major source of calcium, are present today in greater amounts than in 1909-13 but in lesser amounts than in 1947-49. The proportion of total calcium provided by dairy products has increased from two-thirds in 1909-1913 to three-fourths today. A smaller proportion of this calcium is supplied by fluid milk today, than in 1909-1913; a larger proportion is now supplied by dry nonfat milk, cheese and frozen dairy products than when data on use of these products were first reported. These shifts in the consumption of dairy products reflect some marked changes in food habits. As calcium is one of the nutrients shown by surveys to be most often low in the diets of families, these changes are of special concern to nutritionists.

FOOD CHOICES, HABITS, CONSUMPTION AND USE  
(RPA 703 and 704)

USDA and Cooperative Programs

Activity	Scientist Man-years July 1, 1968-March 31, 1969		
	Intramural <u>1/</u>	Extramural <u>2/</u>	Total
Measure Food Consumption and Dietary Levels (703)	6.5	0	6.5
Modification of Food Habits (703)	2.3	0	2.3
Develop Procedures for Food Use in Households and Institutions (704)	2.3	0	2.3
Total	11.1	0	11.1

1/ Scientist man-years for intramural work for the nine-month reporting period are estimated to be 75 percent of scientist man-years devoted to the work during FY 1969.

2/ Although no funds were obligated for extramural work during the present reporting period, a substantial amount of previously funded extramural work continued.



## Problems and Objectives

Information about food consumption and dietary levels is essential to effective consumer education in nutrition and food management, to market analyses, and to agricultural policy and program evaluations--both to provide the basis for such evaluations and to measure progress. Needed are periodic surveys of the kinds, amounts, and costs of food consumed by households and individuals in different population groups; surveys of practices of families in the purchase and use of specific foods; studies of factors affecting food choices; nutritional appraisals of diets and food supplies; and studies to develop procedures that maintain nutrient content, texture, flavor, safety and other qualities during preparation and care of food. To facilitate improvement of the dietary situation, more effective ways of informing people about food and nutrition and of helping them improve their food habits are needed.

Major objectives of the research are to determine

- (1) Food consumption patterns of the nation and of specific population groups.
- (2) Nutritive value of diets and of the per capita food supply.
- (3) Household practices in food management.
- (4) Basis of food habits and how they can be changed.
- (5) Methods for educating consumers about nutrition and food management.
- (6) New or improved procedures for preparing and handling food in homes and institutions.

## Progress - USDA and Cooperative Programs

### A. Food Consumption and Dietary Levels

1. Diets of Households by Region--1965 Nationwide Survey. Food available for consumption in homes was sufficient to provide diets meeting the 1963 Recommended Dietary Allowance of the National Academy of Sciences-National Research Council <sup>1/</sup> for all nutrients in 48 percent of households in the North Central Region and in the South, in 52 percent of the households in the West and 53 percent in the Northeast. These diets were rated "good" <sup>2/</sup>. In all four regions, calcium, vitamin A value and ascorbic acid were the nutrients most often present in less than recommended amounts.

Among urban households, slightly larger proportions of good diets were found in the Northeast and West than in the North Central Region and the South. Among rural nonfarm households, there was a slightly higher proportion of good diets in the North Central than in the other three regions.

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<sup>1/</sup> Comparisons limited to 1963 RDA's because analysis of household food consumption data was well underway before publication of 1968 RDA's.

<sup>2/</sup> Diets that met allowances for all nutrients studied were rated "good." Diets that supplied less than two-thirds the recommended allowances for one or more nutrients were rated "poor."



Farm households of the South had a smaller proportion of good diets and a larger proportion of poor diets than those of the West, the Northeast and North Central regions. Diets rated poor were those that provided less than two-thirds of the recommended allowance for one or more nutrients. For households with incomes under \$3,000, a higher proportion of poor diets was found among rural households in the South and urban households in the North Central region than among any other group of households.

Food patterns were more uniform among regions in spring 1965 than spring 1955, but diets were of a somewhat poorer quality in 1965 than in 1955. Diets of southern households, found to be most frequently below recommended allowances in 1955, showed the least change of the four regions over the 10-year period. Diets of North Central households showed the greatest decline in quality.

2. Diets of Individuals--1965 Nationwide Survey. Amounts of foods eaten during one day (midnight to midnight) in spring 1965 by most of the 22 sex-age groups of individual household members surveyed were on the average sufficient to provide 90-100 percent or more of the 1968 Recommended Dietary Allowances of the Food and Nutrition Board of the National Academy of Sciences-National Research Council for food energy and five of the seven nutrients studied--protein, vitamin A value, thiamine, riboflavin, and ascorbic acid. Calcium and iron were the nutrients most often below allowances.

In general, the diets of males met the allowances for more nutrients than the diets of females. For example, the diets of several age groups of females furnished 5 to 15 percent less than the recommended amounts of vitamin A value, thiamine and riboflavin. The diets of all age groups of males except those 75 years and older averaged well above the recommended allowances for riboflavin and vitamin A value. In thiamine, the diets of all males except those age 12-14 years were above allowances. Infants under two months and men age 75 years and above were the only two groups who had average diets not meeting the allowances for ascorbic acid.

Except for iron, the average diets of children under nine years of age exceeded the recommendations for nutrients.

Several groups of individuals had diets that furnished amounts of calcium and iron as much as 30 percent or more below allowances. The average diets of girls 15-17 years and of women 35 years and over were about 35 percent below the recommended allowances for calcium. The average diets of girls and women 9 through 54 years of age furnished amounts of iron that were about 40 percent below the recommended amount. Diets of infants of 3 to 11 months and of children under three furnished about half the recommended allowances for iron but above recommended amounts of calcium.

Quantities of most foods eaten by men and boys were larger than those eaten by women and girls of the same age. Exceptions were tomatoes and citrus fruit, dark-green and deep-yellow vegetables, and other vegetables (except

potatoes) and fruits. For most foods, consumption by males was greatest in the late teens and early adulthood. There was less difference among age groups in consumption of vegetables and fruits than in consumption of higher calorie food. Average intakes of protein for all age groups were over 100 percent of the recommended allowances with a range of about 110 to 250 percent. Contributions of fat to the total calorie intake ranged from 39 percent for infants to 45 percent for men 20-64 years.

3. Families eligible for food assistance programs, 1961-1967. Families eligible for USDA food assistance programs who were the subjects of ten studies at six locations between 1961-1967 spent less money for food on the average than families in the 1965 nationwide survey with incomes less than \$3,000. They also divided their food dollar differently and spent a higher proportion of their income for food. On the average these "hard-core poor" families had a greater return in calories and most of the nutrients for their food dollar than low-income families in the nationwide survey. They made good use of low-cost foods as a source of nutrients and spent little for snacks and meals away from home.

Both groups of families used about the same amounts of foods in the bread-cereal group. In most cases, families eligible for food assistance used less of foods in the milk, meat and vegetable groups than low-income families in the nationwide survey. Calcium, ascorbic acid, and vitamin A value were the nutrients most often present in less than recommended amounts in the diets of families eligible for food assistance and low-income families in the nationwide study. The latter probably had diets of better nutritional quality than did the "hard-core poor" families. Precise comparisons cannot be made because different standards were used for evaluation of the diets in the nationwide survey and in the ten smaller studies.

4. Diets and nutritional status of children in Hawaii. The average nutrient content of food eaten by 281 2-3 year old low- and middle-income children in Hawaii during a 3-day period compared favorably with the 1968 NAS-NRC Recommended Dietary Allowances except for iron. Calculations of the nutrient content of individual diets indicated that approximately three-fourths of the children consumed food containing less than two-thirds the allowance for iron. About one-third consumed food providing less than two-thirds the allowances for calcium and ascorbic acid. Something less than one-fifth had diets low in vitamin A. Except for iron, the nutrient content of food eaten by middle-income children was higher than that eaten by low-income children. Differences were most apparent for calcium and ascorbic acid.

In the low-income families, 34 percent of the children studied were receiving a vitamin supplement; in middle-income families, 78 percent. The supplements had been prescribed by a physician for 35 percent of the children in low-income families and 70 percent of the children in middle-income families taking them. The mean vitamin intakes of children taking the supplements were two to four times the recommended levels except for ascorbic acid. For this vitamin, intakes were from 1.1 to 1.7 times the recommended level. Many



of these children had no apparent need for vitamin therapy, while others whose diets rated poor could have benefited from therapy. Although iron supplementation was the most obvious need for the greatest number of these children, only 16 percent of the total sample were taking iron preparations. Average intake of these children met or exceeded the recommended level.

The children studied were short for their age in comparison with Fels Institute standards based on mainland studies but their weights were comparable to mainland children of the same age.

Clinical examinations gave no evidence of specific nutritional deficiency. However, some conditions related to nutritional deficiency (poor muscle tone, tooth decay, pallor and apathy) were observed and found to be more prevalent among children from low-income families.

Mild protein malnutrition was indicated in about 20 percent of the children by biochemical evaluation but was not correlated with protein intakes. Excretion levels of thiamine and N-methyl nicotinamide were adequate to high. That at least 4 percent and by some standards about 15 percent of the children were anemic is indicated by the fact that 4 percent of the children had hemoglobin levels of less than 10 grams per 100 ml. of blood, and approximately 15 percent had hemoglobin levels of less than 11 grams per 100 ml.

A paper by M. L. Brown and S. F. Adelson on "Infant Feeding Practices Among Low- and Middle-income Families in Honolulu" has been accepted for publication in Tropical and Geographical Medicine. Several other papers which report results of this research are in preparation.

This research which was carried out at the University of Hawaii under cooperative agreement with ARS was supported in part by the Consumer and Food Economics Research Division and the Human Nutrition Research Division.

#### B. Nutritive Value of National Food Supply

Levels of nutrients per capita provided by the 1968 food supply differ little from those for 1967. There was essentially no change in protein, fat, iron, vitamin A value, niacin and food energy; 1 percent drop in carbohydrate, phosphorus, thiamin, riboflavin and ascorbic acid; and 2 percent drop in calcium. The decreases in calcium, phosphorus and riboflavin are the result of lower consumption of fluid whole milk. The slight declines in carbohydrate and thiamin reflect decreased use of wheat flour, and the drop in ascorbic acid is explained by the decreased use of citrus fruit.

Comparison of data from 1968 with those for 1957-59 shows an increase in calories, protein, fat, and iron largely from greater use of meat, an increase in niacin in part from greater use of poultry, and a decrease in vitamin A value mainly from lower consumption of dark-green and deep-yellow vegetables, particularly sweetpotatoes.

The total calcium in diets in 1968 was lower than in 1947-49 but higher than in 1909-13. Decreased consumption of dairy products, the major source of calcium, accounts for the drop in calcium since 1947-49. Nevertheless, the gain since 1909-13 in the use of dairy products other than butter has been large enough to increase their contribution of calcium to the total supply from two-thirds to three-fourths. There have also been changes in the types of dairy products consumed. As a result, calcium from whole fluid milk is down from 1947-49 and is now at a lower level than in 1909-13. More calcium is furnished by low-fat fluid milks today than in the late 1940's, but less than in 1909-13. The amount of calcium supplied by nonfat dry milk increased steadily until 1960 when it leveled off. Evaporated and condensed milks supplied increasingly large amounts of calcium up to the late 1940's. Since then the use of these products has decreased. Contributions of calcium from cheese and frozen dairy products have continued to increase.

#### C. Nutrition Programs Service

As a result of the intensified nutrition education program initiated during FY 1968, six new State nutrition committees were organized, bringing the total number of nutrition committees or councils to 39 (36 State, 2 territorial and 1 District of Columbia). Three seminars, five consultations, and ten talks were given to groups involved in community nutrition education. As a part of the Division's intensified nutrition education program, four 10-minute TV shows on "Guides for Thrifty Family Meals," one 10-minute TV show on "Adapting Family Menu to Needs of Individual Members of the Family," and nine 3-minute radio spots on weight control were taped. The tapes for the TV shows were used by 50 stations; those for the radio spots by 320 stations.

Bimonthly publication of Nutrition Program News continued. One issue was devoted to a report of the meeting of the Interagency Committee on Nutrition Education held in connection with the June 1968 convention of the American Home Economics Association. Topics discussed in the other three issues were "Nutrition and the Type A Lunch," "Food and Money Management," and "Nutrition Education in Elementary School Programs."

#### D. Food Use 3/

1. Low-income Families. Division staff is cooperating in the development of a series of recipe leaflets and a slide series on use of specific commodities as part of the industry-USDA cooperative effort to develop nutrition education materials for low-income families. The first in the series which is on evaporated milk has been issued by USDA in cooperation with the Evaporated Milk Association. Recipes for a wide range of commodities were developed to help low-income families participating in USDA food distribution programs use these commodities in family meals.

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3/ This research was transferred from HN to CFE in fiscal 1969.



2. National School Lunch Program. Reevaluation of recipes used in the School Lunch Program was completed. New recipes were developed for vegetables and new market forms of several foods. Information derived on yields will be incorporated into a revision of the Food Buying Guide for Type A School Lunches. Directions for using the following commodities in the lunch program were developed for fact sheets issued by the Department: Dehydrated sweetpotato flakes, turkeys (frozen with and without giblets in neck cavity), frozen chickens, canned dried prunes, honey and raisins.

3. Poultry. Research to evaluate procedures and temperatures for roasting poultry showed that chickens roasted at 325° F. and 375° F. had comparable eating quality. Meat yield was higher at 325° F., cooking time shorter at 375° F.

#### Publications - USDA and Cooperative Programs

##### Food Consumption and Dietary Levels

Food Consumption of Households in the Northeast, Spring 1965, Report No. 2, ARS, USDA (July 1968) 213 pp.

Food Consumption of Households in the North Central, Spring 1965, Report No. 3, ARS, USDA (July 1968) 213 pp.

Food Consumption of Households in the South, Spring 1965, Report No. 4, ARS, USDA (July 1968) 213 pp.

Food Consumption of Households in the West, Spring 1965, Report No. 5, ARS, USDA (July 1968) 213 pp.

PETERKIN, B. and RAUSCHERT, M. Food Use in Farm and Urban Households in 1955 and 1965. Family Economics Review. ARS, USDA (September 1968) pp. 3-5.

STEELE, P. Food Expenditures in the South. Family Economics Review. ARS, USDA (December 1968) pp. 3-5.

Food Intake and Nutritive Value of Diets of Men, Women, and Children in the United States, Spring 1965. A Preliminary Report, ARS 62-18 (March 1969) 97 pp.

EAGLES, J. Diets of Low-income Families. Family Economics Review. ARS, USDA (March 1969) pp. 3-7.

SWOPE, D. A. Diets of Men, Women and Children. Family Economics Review. ARS, USDA (March 1969) pp. 7-10.

## Nutritive Value of National Food Supply

FRIEND, B. Nutritional Review. National Food Situation, NFS-126, Economic Research Service, USDA (November 1968) pp. 26-31, and a reprint CFE (Adm.) 299-3.

Nutrients Available for Consumption Per Capita Per Day, 1909-66, Table 38, and Percentages of Total Nutrients Contributed by Major Food Groups in Selected Periods, Table 39. Food Consumption, Prices, Expenditures. Agricultural Economic Report No. 138. Economic and Statistical Analysis Division, ERS, USDA (July 1968) pp. 94-97.

Food Nutrients: Quantities Available for Consumption Per Capita Per Day, United States, 1954-67, Table 807, and Food Nutrients: Percentage of Total Contributed by Major Food Groups, Average 1957-59, Annual, 1967, Table 808. Agricultural Statistics, 1968, USDA, pp. 593-594 (Updated).

## Food Acceptance and Food Habits

BACHEMIN, D., GREEN, B., and LEWIS, H. How Students React to the High School Lunch Program. Louisiana Agriculture, 11 (Summer 1968) pp. 12-13.

## Nutrition Programs Service

Consumer and Food Economics Research Division, Agricultural Research Service, U. S. Department of Agriculture. 1968-69. Four issues of Nutrition Program News. July-October 1968; November-December 1968; January-February 1969; March-April 1969. 4 pp. each.

HILL, M. M. Nutrition Committee Members Meet in Minneapolis. Nutrition Program News, ARS, USDA (July-October 1968) pp. 1-4.

HILL, M. M. Nutrition and the Type A Lunch. Nutrition Program News, ARS, USDA (November-December 1969) pp. 1-4.

CLEVELAND, L. E. Food Money Management. Nutrition Program News, ARS, USDA (January-February 1969) pp. 1-4.

HILL, M. M. Nutrition Education in Elementary School Programs. Nutrition Program News, ARS, USDA (March-April 1969) pp. 1-4.

## Food Use - Family and Institutional

- Keeping food safe to eat: A guide for homemakers. HG-162. ARS, USDA, 12 pp. June 1969.
- Cereals and pasta in family meals: A guide for consumers. HG-150. ARS, USDA, 32 pp. Oct. 1968.
- Pork in family meals: A guide for consumers. HG-160. ARS, USDA, 28 pp. Mar. 1969.
- DAWSON, E. H., GILPIN, G. L., and FULTON, L. H. Average weight of a measured cup of various foods. USDA, ARS 61-6, 19 pp. Feb. 1969.
- HOKE, I. M. Evaluation of procedures and temperatures for roasting chickens. Jour. Home Econ. 60(8): 661-665, illus.
- HOKE, I. M., McGEARY, B. K., and LAKSHMANAN, F. Muscle protein composition and eating quality of fresh and frozen turkeys. Jour. Food Sci. 33(6): 566-571. 1968.
- SINES, M. S. and MOSS, M. A. Canned apricots...A comparison of two forms. Sch. Lunch Jour. 22(9): 79-80. 1968.
- Fliers for Donated Foods Program--ARS cooperating with Consumer and Marketing Service (Published by C&MS):
- Evaporated milk: A good choice for the thrifty family. Unnumbered. 4 pp. illus. Oct. 1968.
  - Donated instant nonfat dry milk for family meals (fortified with vitamins A and D). Unnumbered. 3 pp. Sept. 1968.
  - Canned whole chicken for family meals. Unnumbered. 4 pp. Aug. 1968.
  - Canned boned turkey for family meals. Unnumbered. 4 pp. Dec. 1968.
  - Scrambled egg mix for family meals. Unnumbered. 4 pp. Rev. Nov. 1968.
  - Corn syrup blend in family meals. Unnumbered. 2 pp. Aug. 1968.
  - Honey. Unnumbered. 2 pp. Oct. 1968.
  - Canned dried prunes. Unnumbered. 4 pp. Nov. 1968.
  - Prunes for family meals and snacks. Unnumbered. 4 pp. Aug. 1968.
  - Lard (stabilized) for family meals. Unnumbered. 3 pp. Aug. 1968.
- Food value stretchers. Recipes using evaporated milk and other donated foods. Narrative guide for slide set and film strip presentation. C-152, 12 pp. 1968.

HUMAN NUTRITIONAL WELL-BEING  
(RPA 708)

USDA and Cooperative Programs

Activity	Scientist Man-years July 1, 1968-March 31, 1969		
	Intramural <u>1/</u>	Extramural <u>2/</u>	Total
Develop Standard Reference Tables on the Nutritive Value of Foods	4.4	0	4.4
Develop Nutrition Guidelines for Education and Action Programs	2.6	0	2.6
Total	7.0	0	7.0

1/ Scientist man-years for intramural work for the 9-month reporting period are estimated to be 75 percent of scientist man-years devoted to the work during FY 1969.

2/ Although no funds were obligated for extramural work during the present reporting period a substantial amount of previously funded extramural work continued.



## Problems and Objectives

An increasing number of studies designed to provide knowledge about the relationship of food eaten by people to their physical and mental development and well-being are reported in the literature. Interpretation and evaluation of the findings and guidance in applying those with implications for food and nutrition programs are of vital importance if people are to obtain the greatest benefits from this research. Developments in cultural, breeding, and manufacturing practices introduce new food products and changes in the composition of others. The number of nutrients recognized as important continues to increase. Representative nutritive values that reflect these developments as well as the latest developments in analytical techniques are required for application in a variety of problems. Source materials such as food budgets and dietary guides based on advancing knowledge are needed for use in nutrition and consumer programs.

Major objectives of the research include:

- (1) Development of representative nutritive values for all types of foods.
- (2) Review and interpretation of research findings on food and nutrition for application to and evaluation of action programs such as child feeding and commodity distribution to needy families.
- (3) Development of food guides and food budgets.

## Progress - USDA and Cooperative Program

### A. Tables of Food Composition

Work to obtain data for the Division's tables of food composition is proceeding along several lines. Analyses are continuing to provide data on the (1) physical and chemical composition of turkey and its anatomical parts, (2) relationships among nutrients in milk and selected cheeses <sup>1</sup>/<sub>2</sub>, and (3) amino acid content of fruits and vegetables. Through the cooperation of industry, data have been obtained for 33 spices and herbs on the content of 14 mineral elements, eight of them trace elements, and on proximate composition and weight volume relationships. Specifications have been developed for work which will provide data on the sodium and potassium content and proximate composition of selected kinds of nuts, raw and cooked legumes and raw and cooked chicken. Preparation of data for a new handbook which will provide values for calories and nutrients in common household measures and market units of foods is about three-fourths complete.

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<sup>1</sup>/<sub>2</sub> This work is supported jointly by the Human Nutrition Research Division and the Consumer and Food Economics Research Division.

Home Economics Research Report No. 36, "Pantothenic Acid, Vitamin B<sub>6</sub> and Vitamin B<sub>12</sub> in Foods," is scheduled for publication in August 1969. It provides representative average values for the content of these three B vitamins in 723 food items. For 223 food items, data on the relative proportion of the three forms of vitamin B<sub>6</sub> are given.

A chapter entitled "The Nutritive Value of Foods and Use of Tables Listing Them" has been prepared for the 1969 Yearbook of Agriculture.

## B. Nutritive Value of Meals as Served

1. Type A school lunch. As part of a nationwide study on the nutrient content of type A school lunches as served to sixth graders, fatty acids and total sterols were determined on 20-lunch composites obtained in fall 1966 from each of 300 schools located in 19 States and 5 geographic regions. The average fatty acid content of the lunches was 28.6 grams or 90 percent of the average fat content of 31.8 grams. Of these 28.6 grams of fatty acid, 14.6 grams were saturated, 10.2 grams were monounsaturated and 3.8 grams were polyunsaturated fatty acids. Palmitic, stearic, myristic and oleic acids accounted for about 80 percent and linoleic acid for about 10 percent of the total fatty acid content. As the percentage of fat in the lunches increased, the proportion of fatty acids coming from long chain (C<sub>18</sub>) and unsaturated fatty acids also increased.

Linoleic acid provided approximately 4 percent of the total calorie content of the lunches. No schools served lunches in which an average of less than 1 percent of the calories came from linoleic acid, but about one-third of the schools served lunches in which less than 3 percent of the calories came from linoleic acid. Examination of data from the individual schools showed that the percentage of linoleic acid in the lunches increased with percentage of total fat, total calorie content per 100 grams of lunch and with the proportion of calories coming from fat. The linoleic acid content was not related to vitamin A or vitamin D content. Total sterols including but not exclusively cholesterol varied from 16 to 331 mg., averaging 112 mg. per lunch. Lunches of only 6 percent of the schools had a sterol content greater than 160 mg. Evaluation of data on the mineral element content of the lunches is in progress.

Two more publications based on findings from research on nutritive value of the type A lunch have been accepted for publication. They are "The Vitamin Content of Type A School Lunches" by E. W. Murphy, P. C. Koons and L. Page which is to be published in the Journal of the American Dietetics Association and "The Nutritive Content of Type A School Lunches" by P. C. Koons and E. W. Murphy, scheduled for publication in the June 1969 issue of Family Economics Review.

2. Nutritive value of meals--calculated vs. analyzed. Sample breakfasts, lunches and dinners served to students each day for seven consecutive days were collected at 50 colleges and universities. Individual foods in the

meals were weighed, composited, and shipped in the frozen state to a commercial laboratory for analysis. A sample of water used in food preparation was also obtained from each school. Analysis of the meal composites for proximate composition, eight vitamins (and beta carotene), 10 minerals, fatty acids and cholesterol, and of the water samples for 10 minerals is in progress. The nutritive content of the meals as determined by laboratory analyses will be compared with values calculated from tables of food composition.

### C. Food Budgets and Guidance for Food Programs

The nutritive value of foods in the USDA food plans for four cost levels for 20 age-sex groups developed in 1964 were evaluated using the 1968 Recommended Dietary Allowances set by the Food and Nutrition Board of the National Academy of Sciences-National Research Council. The plans provide the RDA's for food energy, protein, calcium, vitamin A value, thiamin, riboflavin and ascorbic acid. They do not provide the RDA for iron for some individuals but they do provide the amounts of iron specified as those "expected from a normal diet."

Data from the spring 1965 nationwide food consumption survey--both household and individual--were studied to determine how quantities of foods in the plans relate to latest information on food use. Compared to food used by low-income households, the low-cost plan provides less fats and oils; sugars and sweets; meat, poultry, and fish; and citrus and tomatoes; and more of other vegetables and fruit, particularly potatoes; dairy products; and eggs. The plan reflects consumption of most of these food groups by low-income families in 1965 less well than by families surveyed in 1955. Compared to average intake of individuals, the low-cost plan (converted to an as served basis) provides about the same or more of all food groups except meat, poultry, and fish.

The U.S. average cost for the low-cost plan for a family of four with school children increased 4.7 percent during 1968--from \$27.40 in December 1967 to \$28.70 in December 1968. Costs in the South were slightly lower, \$26.20 (December 1968), than in the other regions--North Central, \$29.00; West, \$26.90; and Northeast, \$31.40.

The plans continue to be used widely in educational programs, welfare administration, food program administration, and in the construction of standard budgets for economic and public policy determinations. For example, costs for the plans were used as food components of budgets in "Three Standards of Living" recently published by the Bureau of Labor Statistics. The cost of the Economy Food Plan is being used as a basis for income lines for determining poverty levels and as the standard cost of a nutritionally adequate diet in the Expanded Food Stamp Program.

Interpretation of research findings for application to problems in food selection and food use is a continuing activity of the Division. Special attention is given to providing scientific support and technical assistance to action programs of the Department and other government agencies. For example, as a follow-up of the nationwide study on the nutrient content of



type A school lunches, a method for safeguarding the nutritional quality of the lunches was devised and a preliminary plan for its use submitted to the School Lunch Division, Consumer and Marketing Service. Estimates, for use in planning food programs and policies, were made of the quantities of milk, vegetables and fruit needed to bring U. S. household diets to recommended levels for calcium, vitamin A, and ascorbic acid. A system for evaluating the Expanded Food and Nutrition Education Program of the Federal Extension Service was developed in cooperation with the Economic Research Service and the Federal Extension Service.

#### Publications - USDA and Cooperative Programs

##### Tables of Food Composition

WATT, B. K. The Nutritive Value of Frozen Foods. Chapter 14 in "The Freezing Preservation of Foods," Volume No. 2, 4th Edition. AVI Publishing Company, Inc., Westport, Connecticut (1968) pp. 327-362.

##### Food Budgets and Food Guides

Cost of Food at Home. Family Economics Review. ARS, USDA (September 1968, December 1968) p. 23; (March 1969) pp. 25-27.

PETERKIN, B. Food Selection for Good Nutrition in Group Feeding, HERR-35. ARS, USDA (October 1968) 32 pp.

EVANS, B. The Cost of Cooked Lean in Selected Cuts of Meat. Family Economics Review. ARS, USDA (September 1968) pp. 12-13.

Cost of a Week's Food for Seven Types of Families. Family Economics Review. ARS, USDA (December 1968) p. 16.

Food Plans: Food Cost at Home at Three Cost Levels. Agri. Stat., 1968, USDA. Table 815, p. 600.

Cost of a Week's Food by Family Type, June 1968. Hdbk. Agricultural Charts, 1968. AH-359. USDA (November 1968) p. 60.

Food for the Family With Young Children, HG-5. ARS, USDA (Slightly revised August 1968) 16 pp.

Food for the Family With School Children, HG-13. ARS, USDA (Slightly revised October 1968) 24 pp.

Food Guide for Older Folks, HG-17. ARS, USDA (Slightly revised July 1969) 16 pp.

Nutrition...Food at work for you. HG Sep. 1. ARS, USDA. 16 pp., Dec. 1968.



USE OF FAMILY RESOURCES  
(RPA 802)

USDA and Cooperative Program

Activity	Scientist Man-years		
	July 1, 1968-March 31, 1969		
	Intramural <u>1/</u>	Extramural <u>2/</u>	Total
Measure Family Use of Resources and Identify Economic Problems of Families	4.0	0.6	4.6

1/ Scientist man-years for intramural work for the 9-month reporting period are estimated to be 75 percent of scientist man-years devoted to the work during FY 1969.

2/ Includes only scientist man years for extramural work for which funds were obligated during the reporting period. Other extramural work in progress was funded during earlier reporting periods.

## Problems and Objectives .

Information on the resources available to families, the decisions families make regarding their use and the levels of living provided are needed to develop programs to improve levels of living.

Major objectives of the research are to

- (1) Determine the effects of economic and psycho-sociological factors on the allocation of family resources.
- (2) Identify the family financial management patterns that are associated with desirable levels of living.
- (3) Identify the levels of living obtainable in different socioeconomic situations.

## Progress - USDA and Cooperative Programs

### A. Rural Family Living Studies

1. Income needed for equivalent levels of living for farm and nonfarm families. Farm families need about 90 percent as much income as comparable urban families to maintain equivalent levels of living. Income needs of rural nonfarm families are smaller--about 85 percent of those of urban families. These findings are based on analysis of data for low-income families of selected family types and sizes in the North Central and Southern regions. The difference between these findings and those presented earlier by Madden, Pennock, and Jaeger in "Rural Poverty in the United States: A Report by the President's National Advisory Commission on Rural Poverty," are the results of refinements in techniques.

2. Effects of credit on the pattern of family expenditures. Analysis of North Central rural nonfarm data from the 1960-61 Survey of Consumer Expenditures gave no evidence that commitment of income to recurring fixed payments materially reduces expenditures for food. Only 5 percent of the observed variation in food expenditures was found to be attributable to variation in the fixed commitments included in this study. These were payments for housing (either rent or property taxes, payments on mortgages and on home improvement loans); premium payments on property, household effects, life, health, disability, income maintenance, and automobile insurance; social security taxes and payments into other retirement programs; and automobile debt payments. The volume of payments on consumer installment debt other than that on automobiles could not be determined from the survey. Had it been possible to include these payments in fixed commitments, a closer relationship between the levels of fixed commitments and expenditures on food might have been revealed.

A report of findings of a study of the interrelation of the consumption and investment aspects of mortgage credit is being prepared for publication. This study was also based on the rural nonfarm data from the 1960-61 survey.

## B. Management of Family Resources

1. Time used for household tasks. Analysis of data obtained from 1,300 families in Syracuse and Onondaga County, New York in 1967-68 showed that time spent on household work averaged about 6 hours a day for full-time homemakers with no children (4 hours when the woman was under age 25). Full-time homemakers with one child averaged 7 hours a day; those with two or three children, 8 hours; with four to six children, 9 hours; and with seven or more children, 10 hours. Total working time (job and home) for homemakers with a job outside the home averaged 10 hours. Husbands spent about 1.5 hours a day in household work, mainly maintenance of house and yard and care of family. These findings are from a study at Cornell University that is partially funded by a research grant. The purpose is to develop unit-of-work values for major household tasks. Such values will provide a basis for decisions on use of time to increase home production, earn money, or improve quality of living. They also will serve as a basis for putting a monetary value on household work done by family members, enabling economists to impute the money value of household production for State and national income series.

## C. Clothing Acquisitions and Care

The frequency of receipt of clothing from supplementary sources (i.e., other than purchase of new garments) and the variations among types of families were studied in order to determine the importance to be assigned to supplementary sources in the construction of clothing budgets. During the survey year, 93 percent of the 419 families in a low-income area of Des Moines surveyed received gifts of new clothing from outside the family; 62 percent received used clothing handed down from outside the family; 43 percent handed some down within the family; 37 percent constructed some new garments at home; 19 percent purchased some used clothing at an average expenditure of \$7.37 for those purchasing; and 18 percent received some clothing as pay, bonus, stamp purchase or prize. In addition, 20 percent of families borrowed some clothing and 8 percent rented some.

White families and families in which the wife or female head had relatively more education were more likely than their opposite numbers to receive gifts of new clothing from relatives or friends. Large families and those with lower incomes were more likely than other families to receive garments handed down from outside the family. Large families, families at the poverty line as distinguished from those above or below it, and families with access to a sewing machine were more likely to hand down garments within the family. Families below the poverty line and those in which the wife or female head had relatively little education were more likely than other families to purchase used clothing.



These findings are from a study of clothing practices of low-income families which is being carried out under cooperative agreement with Iowa State University.

#### D. Family Economics Review and Outlook Conference

Three issues of Family Economics Review were published during the nine months covered by this report. The Division was responsible for planning three sessions on family living at the Agricultural Outlook Conference of February 1969. These sessions were concerned with "Housing for Families," "Foods and Nutrition," and "Low-income Families." In addition, a paper was prepared by CFE staff on "Clothing and Textiles: Supplies, Prices and Outlook for 1969" for distribution at the Conference and for later summarization in Family Economics Review.

As charts prepared for the Division's research reports, Family Economics Review, and Outlook papers are widely used by speakers and writers from outside the Division, a compilation of charts of lasting interest was prepared and published. The objective of the publication is to make the charts more easily available.

#### Publications - USDA and Cooperative Programs

##### Rural Family Living Studies

MADDEN, J. P., PENNOCK, J. L. AND JAEGER, C. M. Equivalent Levels of Living: A New Approach to Scaling the Poverty Line to Different Family Characteristics and Place of Residence. Chapter 27 in Rural Poverty in the United States: A Report by the President's National Advisory Commission on Rural Poverty. Government Printing Office, Washington, D. C. (1968) pp. 545-552.

##### Management of Family Resources

SMYTHE, K. D. An Approach to Determining Safe Levels for Family Credit Commitments. Journal of Consumer Affairs. Vol. 2 (Winter 1968) pp. 167-181.

##### Clothing Acquisitions and Clothing Budgets

SISTER CATHERINE PETERS. Clothing Acquired from Selected Supplementary Sources by Low to Moderate Income Families in a Midwestern City. M.S. Thesis, Iowa State University (1968) 262 pp.

BRITTON, V. Purchases of Various Types of Clothing for Men, Women and Children. Family Economics Review, ARS, USDA (September 1968) pp. 5-11.



Family Economics Review and Outlook Conference

BRITTON, V. Clothing and Textiles: Supplies, Prices, and Outlook for 1969. Family Economics Review. ARS, USDA (March 1969) pp. 16-19.

BRITTON, V. Use of Manmade Textile Fibers Increasing. Family Economics Review. ARS, USDA (December 1968) pp. 9-11.

BRITTON, V. Textile Fibers in Clothing and Home Furnishings. Family Economics Review, ARS, USDA (December 1968) pp. 11-13.

Charts of the Consumer and Food Economics Research Division. ARS 62-20 (March 1969) 16 pp.

Consumer and Food Economics Research Division, Agricultural Research Service, U.S. Dept. of Agric. 1968-69. Three issues of Family Economics Review, ARS 62-5. September 1968, 24 pp.; December 1968, 24 pp.; March 1969, 27 pp.

The Family. Section 4 in Handbook of Agricultural Charts 1968. Agricultural Handbook No. 359. Figures 64-74 (November 1968) pp. 57-63.

WOLGAMOT, I. Home Economists Contribute to Rural Development. Family Economics Review, ARS, USDA (December 1968) pp. 13-15.

